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BIRDS COLLECTED DURING THE WHITNEY SOUTH SEA EXPEDITION. XIV¹

By ERNST MAYR

WITH NOTES ON THE GEOGRAPHY OF RENNELL ISLAND AND
THE ECOLOGY OF ITS BIRD LIFE

By HANNIBAL HAMLIN

Rennell Island was discovered in 1801 by Captain Butler of H. M. S. 'Walpole.' Among the earliest visitors to the island were Bishops Selwyn and Patteson of the Melanesian Mission in 1856, who recognized the Polynesian affinities of the natives. Undoubtedly there were trading vessels and possibly whalers that called in the old days, but they left no record of their visits. Information about Rennell is both scanty and scattered, although its location has been known to local navigators for many years. The first regular steamer connecting the Solomon group and Australian ports used to sail on a course set for Rennell as a landfall after leaving the Queensland coast. But no European settlement was ever contemplated and no trading station established, principally because of a lack of sheltered anchorage and the island's relative isolation.

The bay on the southwestern coast is the only one that affords protected holding ground for a ship of any size. A plan of this was made by Commander Robert Crookshank, R. N. (retired), who was captain of the Whitney Expedition schooner 'France' during her first visit; it was subsequently published as No. 209 by the Admiralty and described in the 'Sailing Directions.'

The natives of San Cristobal and Guadalcanal tell several fantastic stories about Rennell and its inhabitants. Apparently its existence has always been known to them, although intercommunication was impossible.

Charles M. Woodford, C. M. G., published the earliest authoritative account of Rennell,² which he visited in 1906, the trip having been

¹Previous papers in this series comprise American Museum Novitates, Nos. 115, 124, 149, 322, 337, 350, 356, 364, 365, 370, 419, 469, and 486.

²1916, 'On Some Little-known Polynesian Settlements in the Neighborhood of the Solomons.' The Geographical Journal, XLVIII, No. 1, pp. 45-49.

made chiefly in his capacity as the first Resident Commissioner of the British Islands Protectorate. Woodford was an accomplished naturalist and had sent many fine bird collections to the British Museum before his government appointment, but on this occasion he managed to capture only one specimen. His description is as follows:

During my short visit I obtained one most singular bird which has been described as a new genus and species under the name of *Woodfordia superciliosa*. A description and plate of this bird have recently been published in *The Ibis* (*Ibis*, January, 1916). At Rennell I also noticed the black-headed Ibis (*Ibis strictipennis*, Gould) a bird which during a thirty years' experience of the Solomons I have never seen there, nor has it been recorded by others.

This single specimen of *Woodfordia*, a genus included under the Zosteropidæ, was the only example of the Rennell avifauna known to ornithology prior to the visits of the Whitney Expedition.

A. S. Meek, the most successful bird collector on the Solomon Islands, discussed with Lord Rothschild and Dr. Hartert the possibilities of a prolonged visit to Rennell in connection with his collecting trips through the Solomons in the interests of the Tring Museum, but the prospect was abandoned as impracticable.

Bellona, a small island of regular shape, having a circumference of about eight miles, lies fifteen miles northeast of Rennell. A visit to both islands, following that of Woodford, is recorded for the same year (1906) by a Mr. Alfred Stephen of Sydney, who was searching for phosphate. Between the years 1909 and 1911 Dr. Northcote Deck and J. Hedley Abbott visited Rennell several times in the hope of establishing a station for the South Sea Evangelical Mission. They were able to examine the island more thoroughly than anyone had before, and Dr. Deck published an account which deals chiefly with the population.¹

During September and October of 1927, G. A. Stanley and J. H. Hogbin spent several weeks on Rennell in behalf of the government of New South Wales and the University of Sydney. The results of their explorations add considerably to the general physiographical knowledge of the island, although only one article about the expedition has appeared.²

Rennell is the southernmost island of the British Solomon Islands. Lying in lat. 11° 40' S., and long, 160° 18' E., it is approximately ninety miles southwestward of San Cristobal, a position somewhat isolated in relation to the rest of the group. Its shape is long and narrow, aligned

¹1921, *The Geographical Journal*, LVII, No. 6, pp. 474-479.

²1928, G. A. Stanley, 'Physiographic notes on some of the British Solomon Islands.' *The Australian Geographer*, I, pp. 29-39.

along the general path of the trade wind, and measures forty-two miles in an east-southeast to west-northwest direction, and not more than twelve miles in breadth at its widest part. Topographically it resembles a kind of platter, and it has been cited as the most remarkable example of an elevated atoll in existence. The altitude of the island is uniformly between 300 and 400 feet, the terrain rising abruptly from the sea in terraced bluffs and cliffs of coralline limestone. Sandy beaches occur along the coast in scattered places; many of them covered at high water.

The geological history of Rennell implies that only the higher parts of the outer rim were once at sea-level in the annular form of an atoll. There is a marked central depression which slopes to an elevation approximating sea-level toward the southeastern half, where there is an inland lake ten miles long and three miles across which the natives call "Tengano." Although entirely separated from the coast on all sides, continual seepage occurs through fissures in the limestone. This rough, coralline rock, which varies considerably in lithological character, appears to be the prevailing formation. Fossil corals and shells are nearly always visible. Patches of reddish soil, however, occur throughout the inland area and offer fertile ground for cultivation.

The Whitney Expedition visited Rennell Island on two occasions on the schooner 'France,' anchoring in the same locality both times—Kungava Bay on the southwestern side. The first visit occupied eleven days (August 27–September 7, 1928) and yielded by far the greater part of the collection. A week's time was put in on daily trips from the vessel, an active staff of four field workers, the writer and three trained Polynesian assistants, making the most of good weather. A stay in camp near the inland lake was shortened to only three days due to lack of ammunition. About 240 specimens representing 25 species were taken during this time; a few of these inhabit the lake region exclusively. The second visit occupied about a fortnight (May 17–29, 1930) and was accompanied by an unusual run of rainy weather that impeded the collecting to a considerable degree. Despite this fact 140 skins were prepared, including eight species not before taken, and additional specimens of species previously not well represented. On this occasion the field party was composed of the writer, William F. Coultas, and Walter J. Eyerdam.

One day of our time was spent at Bellona Island where the hunting produced no forms that varied from those taken on Rennell. A single example of *Accipiter fasciatus* was shot and two species of cuckoos.¹

¹*Cacomantis pyrrhophanus* and *Chalcites lucidus*.

A longer stay might have yielded further results; but only under extraordinary weather conditions can the island be approached safely. With a sea of any size running it would be impossible to land. We were very anxious to investigate Bellona, particularly because it differs considerably from Rennell in formation. The elevation does not exceed 150 feet, and the superabundance of coralline limestone so typical of the larger island does not occur. Inland the forest has a floor of rich earth with spots of coral rock. The undergrowth of vegetation is very thick, and large trees are quite plentiful. It would have been interesting to have found what bird species were absent as compared with Rennell. The one most in evidence proved to be the blue coot (*Porphyrio albus*); so much so that the natives fence in their gardens against its depredations. Other species noted in this hasty survey were *Ducula pacifica*, *Ptilinopus rhodostictus*, *Aplonis insularis*, *Halcyon chloris*, and *Coracina lineata*.

At Rennell we were able to spend the time necessary to observe the bird distribution in its relation to habitat and landscape. The whole island is densely wooded but in varying degrees. The character of the forest depends on the interspersions of coralline limestone, the predominating formation, which stunts the growth of vegetation wherever it occurs. Low trees are in great abundance (varying from 20 to 50 feet in height). Smaller saplings and underbrush are thick wherever root-hold can be obtained in soil. Bushes grow out of interstices in the coral and many varieties of vines entwine the tops of the smaller trees. The great, lofty ones, that grow over extensive areas on other tropical islands of non-atoll origin, are noticeably segregated.

It is remarkable how many of the more common passerines inhabit the lower vegetation. In addition to *Gallicolumba beccarii* and *Calænas nicobarica*, which are wholly ground-dwelling, two species—*Pachycephala feminina* and *Turdus poliocephalus*—are usually seen hopping about on the points of coral or in the very low shrubbery. Slightly higher, not more than ten or fifteen feet above the ground, the insectivorous flycatchers and fantails find their best hunting ground, *Pinarolestes hamlini* and *Rhipidura rennelliana* being the most common. The latter would answer and approach readily when called.

Gerygone flavolateralis we found extremely tame; individuals often had to be frightened away from a too close gun range. This species would be included in a group whose vertical distribution in the forest is more general, ranging higher up in the foliage of the lower trees. They might be called "lower tree inhabitants": *Zosterops rennelliana*, *Myzomela cardinalis*, and *Aplonis insularis*.

Relatively few species are found in the tops of the higher trees, only one in particular, *Ducula pacifica*, the common pigeon which calls from the topmost branches. Of more general distribution in the upper forest are a beautiful little dove (*Ptilinopus rhodostictus*) and two lorries (*Lorius chlorocercus* and *Geoffroyus heteroclitus*). The fruit and nut trees are the highest ones, so the attraction would appear to be food interest. Both the pigeon and the dove are captured by natives and tamed as pets.

Another type of landscape is provided by native gardens where smaller passerines are often found feeding, usually in the lower trees and secondary growth along the edges. As in the case of Bellona, the blue coot (*Porphyrio*) is common, being considered a pest by the natives. Many of the plantations include groves of papaya, a fruit that was introduced about two decades ago, according to report. *Woodfordia superciliosa*, the species that first attracted the attention of ornithologists to Rennell, is perhaps the easiest bird to collect because of a preference for the papaya trees where it regularly feeds in considerable numbers. While often seen in the low trees of the forest, *Woodfordia* is noticeably more common in the papaya groves.

The vicinity of the lake offers a specialized habitat that harbors several species, notably those living primarily on its surface, the two species of duck (*Anas superciliosa* and *Anas gibberifrons*), the grebe (*Colymbus ruficollis*), and the cormorant (*Phalacrocorax melanoleucus*). The larger teal and the cormorant are plentiful compared to the others, but none of the lake species is easily collected because of the attendant difficulties. One has to be navigated around in a cumbersome canoe, shooting in hit-or-miss fashion with no possibility of concealment. All of our hunting was done around the western end of the lake which is dotted with islets. A great deal of the lake shore and these islets in particular support extensive patches of pandanus. Small birds are very uncommon in this kind of vegetation. One species noted, not entirely confined to the lake district, but more common thereabouts, is the ibis (*Threskiornis aethiopicus pygmaeus*). Toward evening great flocks of them are usually seen flying silently away from the lake toward the forest. Several specimens were taken near the saltwater coast; and I have seen individuals fly up from the edge of the clearings along bush trails and from native gardens. Both the ibis and grebe were nesting when the expedition conducted its first trip; three nests of the latter were discovered and clutches of eggs collected.

Very little can be written about the spoonbill (*Platalea leucorodia regia*), another member of the lake-dwelling community. One example,

a rather immature specimen, was shot on our second visit. I have noted that two were seen during the first, one flying low over the pandanus trees close to the lake shore, and the other sitting on the branch of a dead tree. The natives seemed to regard this species with some degree of awe and professed to have no knowledge of its habits. They were able to impart valuable information about most of the other birds, but nothing important concerning the spoonbill. According to their stories the few representatives of the species had been on the island ever since its existence, and were under the particular patronage of their god. We were fortunate in being able to carry away our single skin.

In general the avifauna of Rennell distributes itself by habitat and landscape into the lake vicinity species and those inhabiting the forest. The latter have been described as belonging to the particular kind of forest environment in which they were most often encountered. Their surroundings, their feeding, and their adjustments appear to be as natural as one could wish to find on an island inhabited by man. The presence and activity of the natives does not seem to have affected their habits to any great degree. There are no mammals, either indigenous or introduced, except a few species of bats which are harmless. In this respect Rennell is unique for an island of its size in the western Pacific. Rarely visited until recently, its fauna had been undisturbed and was practically unknown to natural science until visited by the Whitney Expedition. The material now available offers to Dr. Mayr an opportunity for long-awaited investigation of great importance.

SOME NATIVE NAMES

<i>Colymbus ruficollis</i>	manusingé
<i>Phalacrocorax melanoleucus</i>	manugitai
<i>Dupetor flavicollis</i>	tagoa
<i>Platalea regia</i>	tetonga
<i>Threskiornis aethiopicus</i>	tatagoa
<i>Anas superciliosa</i>	teganinali
<i>Anas gibberifrons</i>	teganinali
<i>Accipiter fasciatus</i>	tetaba
<i>Porphyrio albus</i>	tekongai
<i>Ducula pacifica</i>	tengupé
<i>Lorius chlorocercus</i>	tesibingé
<i>Geoffroyus heterochlitus</i>	tegithua
<i>Collocalia esculenta</i>	tapekapeka
<i>Hemiprocne mystacea</i>	tebabenubenu
<i>Coracina lineata</i>	tetingovai
<i>Aplonis insularis</i>	tegapidu
<i>Turdus poliocephalus</i>	tengangangau
<i>Myiagra vanikorensis</i>	tatongivitongi

THE RELATIONSHIPS AND ORIGIN
OF THE BIRDS OF RENNELL ISLAND

THE ZOÖGEOGRAPHICAL POSITION OF RENNELL ISLAND

Before we analyze distributionally the 38 species known from Rennell Island, we should first eliminate the five species not known to nest on the island. They are three seabirds and two migrants from Australia.

NON-BREEDING SPECIES

- 11.—*Sterna sumatrana sumatrana* Raffles
- 12.—*Sterna bergii cristata* Stephens
- 13.—*Anous stolidus pileatus* (Scopoli)
- 22.—*Chalcites lucidus* (Gmelin)
- 26.—*Halcyon sancta* Vigors and Horsfield

In the remaining 33 species we have to distinguish between endemic species and subspecies and those which are also found on other islands.

BREEDING SPECIES

I.—Endemic species and subspecies

A.—With the closest relative on the Solomon Islands (northwest of Rennell Island).

- 2.—*Phalacrocorax melanoleucus brevicauda*
- 4.—*Dupetor flavicollis pallidior*
- 14.—*Ptilinopus rhodostictus cyanopterus*
- 19.—*Geoffroyus heteroclitus hyacinthinus*
- 23.—*Collocalia esculenta desiderata*
- 27.—*Coracina lineata gracilis*
- 29.—*Aplonis insularis*
- 37.—*Zosterops rennelliana*

B.—With the closest relative on the Santa Cruz group or the New Hebrides Island (southeast).

- 1.—*Colymbus ruficollis longirostris*
- 25.—*Halcyon chloris amoena*
- 31.—*Gerygone flavolateralis citrina*
- 32.—*Pinarolestes hamlini*
- 33.—*Myiagra vanikorensis occidentalis*
- 34.—*Rhipidura rennelliana*
- 38.—*Woodfordia superciliosa*

C.—With close relatives both east and west (the systematic position of the Rennell bird intermediate between its representatives on the Solomon Islands and Santa Cruz-New Hebrides).

- 30.—*Turdus poliocephalus rennellianus*
- 35.—*Pachycephala feminina*
- 36.—*Myzomela cardinalis sanfordi*

D.—With the closest relative in New Guinea and Australia.

- 6.—*Threskiornis aethiopicus pygmaeus*

¹Numbers refer to the numbered species in American Museum Novitates No. 486.

SUMMARY

Of these 19 endemic forms 8 (=42 per cent) point to an origin from the Solomon Islands, 7 (=37 per cent) point to an origin from Santa Cruz-New Hebrides Islands. This slight difference lies within the limit of a possible error and we can say that in the endemic forms the influence from the Solomon Islands and from the Santa Cruz-New Hebrides Islands is equally strong.

II.—Non-endemic species and subspecies

A.—The same species or subspecies also occurs on the Santa Cruz Group and the New Hebrides Islands.

None.

B.—The same species or subspecies also occurs on the Solomon Islands.

16.—*Gallicolumba beccarii solomonensis*

17.—*Calenas nicobarica nicobarica*

18.—*Lorius chlorocercus*

20.—*Micropsitta finschii finschii*

21.—*Cacomantis pyrrhophanus meeki*

24.—*Hemiprocne mystacea woodfordiana*

28.—*Aplonis cantoroides cantoroides*

C.—The same species or subspecies also occurs in Australia (and on neighboring islands, as New Caledonia or New Guinea).

5.—*Platalea leucorodia regii*

8.—*Anas gibberifrons gibberifrons*

9.—*Accipiter fasciatus vigilax*

D.—The species is widespread (east and west of Rennell Island).

3.—*Demigretta sacra*

7.—*Anas superciliosa pelewensis*

10.—*Porphyrio albus subspecies*

15.—*Ducula pacifica tarrali*

SUMMARY

Of the 14 not endemic forms

7 = 50 per cent point to a northern origin

3 = 21 per cent point to a southern origin

4 = 29 per cent are widespread

What do these figures mean?

THE ORIGIN OF THE RENNELL ISLAND BIRD LIFE

Rennell Island is a raised atoll which is separated from the nearest land by oceanic basins of a depth of 4000–5000 meters. It is therefore a true oceanic island. All the birds there must have reached it by a long distance flight across the separating sea. The nearest islands are the

Solomon Islands in the north, which are 90 miles away (San Cristobal), the Santa Cruz group in the east, which is 350 miles away, and the Louisiade Archipelago in the west, which is 370 miles away.

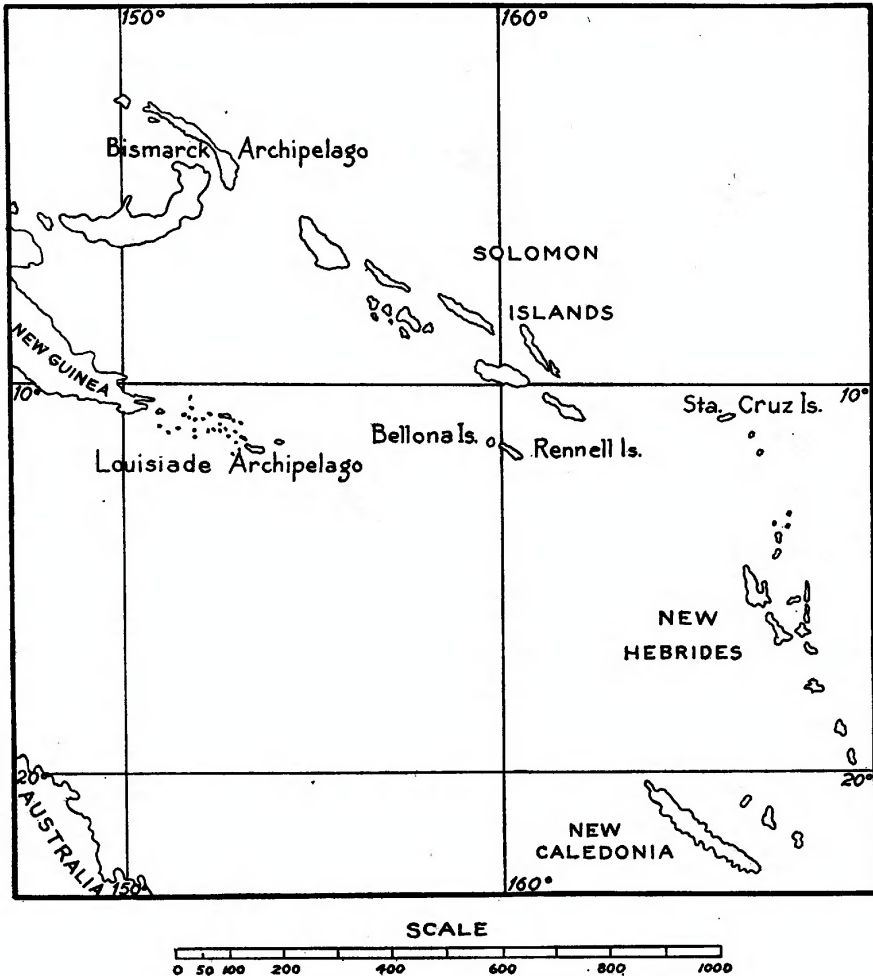


Fig. 1. Relative position of Rennell Island.

The different degree of speciation suggests that the time of immigration has not been the same for all the species. We have endemic forms of a very high degree of independent evolution (as *Pinarolestes hamlini*) and others which are barely different from the neighboring forms. Subspecies deriving from Solomon Island forms are more likely to be "swamped" by newcomers from the same source, as the distance is not

very considerable. Thus we find that most of the subspecies with Solomon Islands relationships are only slightly differentiated, while those which are related to forms on the New Hebrides are much more marked.

Single birds cannot establish a settlement on an island; we might expect, as indeed we find, that most of the birds living on such isolated islands as Rennell are of a social nature. They have probably come to this outlying place in little flocks.

As the Solomon Islands are almost in sight of Rennell Island, we would expect an overwhelming percentage of its bird life to be derived from that group. It is therefore somewhat surprising to find such a strong element showing New Hebrides affinities. Unfortunately, the bird life of the New Hebrides is not very well known, so we do not know exactly how many of its species are missing from Rennell Island. However, a hasty survey of the birds collected by the Whitney Expedition on the Santa Cruz group convinces me that almost every species is also represented on Rennell Island. Even the eastern part of the Solomon Islands shows a certain eastern component. The species *Myzomela cardinalis*, *Ptilinopus rhodostictus*, and *Cacomantis pyrrhophanus* may be mentioned in this connection.

As I have said above, all the birds of Rennell Island must have reached it across the sea. There are three possible sources of immigrants.

I.—The New Hebrides and Santa Cruz group (east and southeast of Rennell Island).

II.—The Solomon Islands (northeast, north, and northwest of Rennell Island).

III.—The Louisiade Archipelago, New Guinea, and Australia (west and southwest).

A study of the prevailing winds in the neighborhood of Rennell Island shows that (according to the 'Pilot Chart of the South Pacific Ocean'¹):

about 56 per cent come from the southeast or east

about 16 per cent come from the northeast, north, or northwest

about 5 per cent come from the west and southwest

about 23 per cent come from the south or are calms (no zoögeographical significance).

These figures, when considered in conjunction with the distances of the above-named three sources of the Rennell Island population, throw some light on the reasons for the present percentages of Rennell Island bird population with relation to origin.

¹Published by the Hydrographic Office, Washington, D. C.

The ecological conditions on Rennell Island are of a very distinct type. As I have said, the Santa Cruz Islands have similar conditions and therefore most of the birds occurring on the Santa Cruz Islands also occur on Rennell Island. On the other hand, the Solomon Islands have a great diversity of environment, and only a very limited number of Solomon Island birds could adjust themselves to the life conditions on Rennell Island.

It is perhaps worth while to consider the negative side of the problem and ask: Which of the Solomon birds live on small coral islands but do not occur at Rennell? Besides the birds found on Rennell Island I would have expected: *Megapodius*, *Macropygia rufa*, *Eos cardinalis*, *Trichoglossus*, and *Monarcha cinerascens*. Further exploration may prove that one or the other of these species does occur on Rennell Island, so I refrain for the present from commenting on the possible causes of their absence.

All the species found on Rennell Island which have their closest relatives in the southwest or west (New Guinea and Australia) are large birds with considerable power of flight. They were able to reach Rennell Island in spite of contrary winds.

SUMMARY

1.—Rennell Island is an oceanic island which was populated from three different sources: the Santa Cruz Islands and New Hebrides in the east, the Solomon Islands in the north, and New Guinea and Australia in the west and southwest.

2.—The direction of the prevailing winds and the distance from the mentioned islands determined the percentage of the faunistic elements.

